



Missions for America
Semper vigilans!
Semper volans!

The Coastwatcher

Publication of the Thames River Composite Squadron
Connecticut Wing
Civil Air Patrol

300 Tower Rd., Groton, CT
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LtCol Stephen Rocketto, Editor
srocketto@aquilasys.com

C/SSgt Virginia Poe, Reporter
C/SrA Michael Hollingsworth, Printer's Devil
Lt David Meers & Maj Roy Bourque, Papparazis

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SCHEDULE OF COMING EVENT

04 JUL-Squadron Picnic
07-11 JUL-ACE Academy I (GON)
09 JUL-MIT Aero-Astro Dept/*USS Constitution*
18 JUL, 2014-CTWG Golf Tournament
19 JUL-02 AUG-Nat'l Emergency Services Acad.

08-16 AUG-CTWG Encampment-Camp Niantic
11-15 AUG-ACE Academy II (GON)
23 AUG-Wing Wide SAREX-HFD

20 SEP-Cadet Ball-USCGA (tentative)
01 OCT-CTWG Commander's Call and CAC
17-19 OCT-CTWG/NER Conference
16-18 OCT-NER AEO Course at Conference
18-25 OCT-NER Staff College-New Jersey

CADET MEETING

01 July 2014
submitted by
C/SSgt Virginia Poe

Cadets ran PT at Poquonnock Plains Park. They completed the mile run, push ups, and sit ups at the park and returned to the squadron for the sit and reach.

C/CMS Ray gave his Armstrong speech on leadership failures. Cadets were reminded to keep their goals in perspective and that every mistake is a lesson.

Flight time consisted of lessons on CAP history. C/CMS Johnstone taught a class on CAP ranks.

SENIOR MEETING

01 July, 2014
Submitted by
Capt. Eliot White Springs

Maj Farley conducted a review of the old eServices system and a introduction to the beta test version of the new format. The review discussed the required entries for WIMRS flight data and also took a cursory look at the ground team requirements. Some time was spent experimenting with ways to research data needed to fill out required forms.

Agreement seemed to indicate that the new system is a more rational layout but old habits will need to be broken by experienced user of the present system.

SQUADRON MEMBER ACHIEVEMENTS

C/Amn Alec deAndrade and C/1STLt Christian Tynan completed Basic Encampment and Regional Cadet Leadership School respectively at the Pennsylvania Wing's Encampment, Fort Indian Gap last week.

LtCol John deAndrade earned a new aeronautical rating, Certified Flight Instructor-Glider passing both the oral and flight examinations at Hartness State Airport, Springfield, Vt.



DeAndrade flying from the rear executes a perfect touchdown and brakes the Schweizer 2-33 to within inches of the pre-selected stop line.

Col Dale Hardy, NHWG and NER Glider Program official was present to assist in the preparation for the proceedings. LtCol Steve Rocketto was deAndrade's automobile chauffeur, pilot, and general lackey. Interestingly, the Designated Pilot Examiner was Mr. William **Stinson** who flew to Hartness in an **Aeronca** 7AC Champion.

COLUMBIA AVIATION EXPOSITION

28 June, 2014

submitted by 2ndLt David Meers

Thirteen members of TRCS attended the Columbia Aviation Exposition at Groton on Saturday. The exposition featured a large range of products including the elegantly aerodynamic Daher-Socata TBM 900 and also included an FAA Wings Seminar on aircraft accidents.

TRCS, led by Lt David Meers, set up a display and used the occasion for a CAP information and recruiting opportunity. Some 300 people were in attendance and many who stopped at our station were unaware of CAP and CAP's missions.

Six cadets manned the information booth; C/CMSgts Keith Trotochaud, Matthew Johnstone, and Thomas Ray, C/MSgt John Meers, CTSgt

Virginia Poe, and C/SSgts Michael and Daniel Hollingsworth



Majs Lintelmann and Farley and Cadet Meers and Davud and Michael Hollinsworth stand in front of our display.

(Photo Credit" Maj Roy Bourque)

Majs Scott Farley and Willi Lintelmann attended the Wings Seminar. Other seniors assisting were Majs Paul Noniewicz and Roy Bourque, LtCol John deAndrade, and 2ndLt Sonia Simpson.

AEROSPACE CURRENT EVENTS

F-35 Farnborough Appearance on Hold

The on-time scheduled appearance of the F-35 at the Royal International Tattoo and Farnborough air show is uncertain. Three three USMC F-35Bs, now at Patuxent River Naval Air Station are awaiting the fourth which is grounded at Eglin Air Force Base. The grounding was precipitated by a fire in an F-35A last week.

The plans were for the four aircraft to make a fly-over during the naming ceremony of Great Britain's new aircraft carrier, HMS Queen Elizabeth. F-35s are planned to equip the ship. Instead, a 1950 era deHavilland Sea Vixen, the last one still flying will replace the four Lightning IIs.

UAL to Assist Biologists in Tracking Tagged Fauna

United Air Lines has joined the Smithsonian Institution's Partners in the Sky and will have some of their aircraft equipped with radio gear for tracking wildlife. The Smithsonian is working on developing VHF transmitters which weight just 0.15 grams, 1/20th the weight of a penny!

The very light tagging devices will enable the biologists to track extremely small creatures such as the monarch butterfly or the american wood thrush in near real-time.

The data realized will be used to study the migration patterns of the creatures in an attempt to understand better their life cycle patterns and possibly mitigate the circumstances that endanger certain species.

Traditionally, tracking has been accomplished using single aircraft, an expensive and limited method or GPS tagging devices relayed by satellites. This second method requires more expensive and much heavier tags which limit their use.

AEROSPACE HISTORY

A Short History of Aerial Photography
by
Stephen M. Rocketto

Part Four

The Cold War-Middle Phase
(1954-1975)

A Look Back at the State of Military and Strategic Intelligence about the Soviet Union

The period between the end of World War II and the middle of President Dwight Eisenhower's first term of office was a time in which almost nothing was known about the capabilities and intentions of the Soviet Union. As George Kennan pointed out, nations do not have allies. Nations have interests and if you wish to understand Soviet foreign policy, look to Russian interests: nationalism even before communist ideology. This was also stated by Winston Churchill: "I cannot forecast to you the action of Russia. It is a riddle, wrapped in a mystery, inside an enigma; but perhaps there is a key. That key is Russian national interest."

Russian was justifiably wary of the West given past experiences from Napoleon to Hitler. She

was also driven by a strong sense of national pride based on her imperial history, cultural excellence, and performance in World War II.

To the proud Russians, World War II was known as the "Great Patriotic War" and they suffered enormously when the Nazis invaded. Over one million civilians and one million troops died during the 28 month siege of Leningrad alone. Compare this to the total of 420,000 U.S. casualties during the entire course of WW II. The Russians justifiably believed that they bore the largest burdens in the struggle against fascism and that their sacrifices were not only not recognized by the West but also may have been increased by western delays in establishing a "second front" in Europe.

Moreover, the Stalinist regime saw the capitalist West as an ideological and economic rival and recognized the danger posed by western fear of communism. The regime was founded and led by conspirators and a conspiratorial mind-set existed among the members of the politburo. One might summarize this as a maxim: Do unto others as they would do unto you, only do it first!

The intoxication of peace, demobilization, budget cuts, and a loss of interest by the politicians and military brought about by the end of hostilities led to the disestablishment of the Office of Strategic Services, our WW II version of the CIA. The very nature of Stalin's police state and Soviet proclivity for secrecy made obtaining good information about anything Soviet almost impossible. Even telephone directory access was restricted.

The sources of information at the start of the Cold War were many but unreliable and incomplete. German prisoners of war had been used to assist in rebuilding the Soviet economy and when they were repatriated between 1946 and 1949, could supply details of factories, mines, and military installations on which they had worked. German technicians and scientists who had been taken to the Soviet Union also had valuable information when they were returned to the west. Displaced persons and defectors also were debriefed by western intelligence officials. Those files of the

German armed forces and intelligence agencies which had been acquired proved useful. Military attaches managed to use their limited travel opportunities to surreptitiously take photos and collect soil and water samples. Captured or collected equipment were examined for markings and part numbers which might reveal details about location of a factory or the quantity of production. Finally, western aircraft exercising their right to fly from West Germany to West Berlin used their opportunities in the "Berlin Corridor" to photograph everything of interest as they flew over Russian bases.

Alas, this flow of information was poorly handled. The varied intelligence operations of the western allies, both military and civilian did not coordinate their activities and assemble the pieces into a coherent whole. The U.S. armed forces were at loggerheads with the civilian CIA whom they felt were incompetent to collect and analyze the equipment, readiness, and force strength of the Russian military. Executive orders eventually forced the competing agencies to limit their turf battles but the lack of hard data crippled efforts to provide reliable briefings to national security policy makers.

Interim Attempts to Gain Information by Aerial Photo-reconnaissance

The state of art of the photo-reconnaissance business was little advanced from World War II equipment and practices. The jet aircraft had increased speed and altitude and cameras were somewhat better but sufficient range to probe the hinterlands of Russia and sufficient altitude to escape detection and interceptions were inadequate. In desperation, some unusual approaches were taken.

Project Genetrix was literally launched in the winter of 1954. High altitude balloons, developed by General Mills, better known for Cheerios, were equipped with cameras and supporting equipment and set adrift from bases in western Europe and Turkey. Over 500 were launched in two months and about 10% recovered with only around 30 providing photographs, quite often of cloud tops

and barren landscapes. The balloons were snatched in mid-air by Fairchild C-119 Flying Boxcars equipped with devices to snag the parachuted instrument packages or they were recovered from the sea by Navy helicopters or ships. Although little useful intelligence data resulted, the recovery techniques were the basis for recovering the early film canisters ejected by the Corona spy satellites. The lost balloons, many of which were retrieved by the Soviets, led to a barrage of diplomatic protests which were answered by predictable US claims that the balloons were just part of a meteorological research project!



*Genetrix launch from the
U.S.S. Valley Forge
(U.S.Navy Photo)*

The 1950 era also saw the use of the Convair B-36 as part of a photo-reconnaissance system. The reconnaissance version of the B-36 was a specially lightened version which could cruise at altitudes which were difficult for interceptors to function but they were big and slow and carried large crews. Efforts to increase the range and lessen the vulnerability of the aerial reconnaissance missions led to experiments in which smaller, less vulnerable aircraft would be conveyed within their range of a target while attached to the larger aircraft. The small aircraft would detach, carry out the mission, and return to the mother ship.

Early attempts used pairs of modified Republic F-84 Thunderjets (EF-84B) which attached to the wingtips of modified B-29s (ETB-29A). A B-36, designated JRB-36F was also tried. The link-ups were difficult to accomplish and the turbulence encountered at the wing tips caused several crashes. Air-to-air refueling seemed a safer and better alternative.

A third attempt used a GRB-36F equipped with a trapeze that extended out from its bomb bay. This was known as FICON or **F**ighter in **C**onvair. The last iteration of this method used an RF-84F Thunderflash as the parasite aircraft. The Thunderflash pilot could ride within the mothership in relative comfort until launch time, enter his aircraft, fly the mission, return to the mothership and be recovered by engaging its nose hook with the trapeze. For a short period of time, a dozen motherships and 24 parasites were operational. However, the B-36s were obsolescent, linkup required high degrees of skill, and the U-2 became available obviating the need for the FICON system.



GRB-36F and YRF-84F (USAF Photo)



RF-84F at Denver's Wings Over the Rockies A&S Museum. Note the hook, camera ports, and the anhedral of the horizontal stabilizers, necessary for fitting the aircraft into the B-36 bomb-bay.

The “special relationship” which existed between US and British intelligence organizations resulted in the loan of the North American RB-45C aircraft to the Brits. Each aircraft carried a panoply of cameras and radar equipment. The information

gained, mostly for targeting purposes, would be shared by the Strategic Air Command and Bomber Command. Three RB-45C aircraft were loaned to the RAF. Training and practice missions were flown. On 17 April, 1952, all three aircraft, carrying the RAF roundel, were launched at night and overflew Soviet territory returning safely. The usual diplomatic protests were filed and the usual responses offered.



RB-45C at the SAC Museum, Mahoney State Park, Nebraska.

The British also used the PR.3 Canberra to overfly Soviet bloc states and Soviet territory. In August of 1953, a crew actually acquired imagery of the Kasputin Yar rocket launch site but was damaged by enemy fire, cooling the RAF's ardor for repeat performances with the Canberra.



English Electric PR.3 at RAF Museum, Hendon

In April of 1954, a second RB-45C night mission was flown with all three aircraft. Soviet defenses were alerted but the flak and fighters were impotent, unable to locate the intruders in the dark. These missions were extremely risky since more

than one aircraft was involved and the flights might have been construed by the Soviets as a bomber attack.

All of these manned missions were dicing with death and lacked the coverage needed. The Air Force and the CIA knew that they needed a aircraft that could achieve the altitude necessary for safety and performed the mission with impunity. A technological answer was forthcoming.

Eisenhower's Science "Mafia"

Eisenhower was well served by a band of scientists whose insights into national security needs led to the development of aircraft and artificial satellites which did much to open the enigma, unwrap the mystery, and solve the riddle of Russian capabilities and intentions.

Edwin Land and James Baker have been mentioned earlier. One of the leaders of the scientific community was James Killian, President of the Massachusetts Institute of Technology. Killian was the first ever Presidential Science Advisor, headed the Foreign Intelligence Advisory Board, and, in the national reaction to Sputnik, the initial Russian space success, oversaw the establishment of the President's Science Advisory Board. Interestingly, Killian earned his academic degree in management and was not a scientist but his leadership style not only was compatible with Eisenhower but found favor with the scientists with whom he worked. He promoted open and frank discussions, valued novel ideas, and had a knack for gaining consensus among a group of strong minded intellectuals. This earned Killian the respect and confidence of not only Eisenhower but also the blue ribbon scientists on his committees.

The major innovations which were developed during this time was the creation of specialized aircraft and concurrently, spacecraft, for the photo-intelligence missions. Until this time, with the exception of the aborted Hughes XR-11 and the Republic XR-12, all photo-intelligence aircraft were modifications of a fighter, bomber, or cargo

aircraft. In 1952, a panel of scientists known as the Beacon Hill Study Group headed by Land recommended an aircraft capable of reaching extreme altitudes.

The Struggle for Adoption of a Specialized Reconnaissance Aircraft

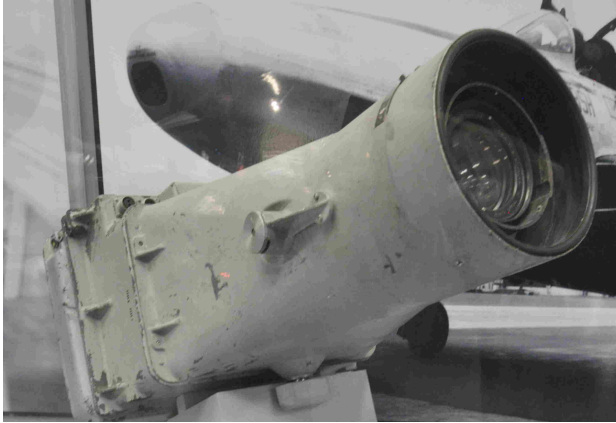
The USAF followed a traditional path and requested that Martin produce a modified B-57 Canberra with the capability of reaching 64,000 feet. Martin added 42 feet to the original 64 foot wing, increased the chord, and Extensive changes were made to the structure to reduce weight. The new aircraft was designated as the B-57D and a production run of 20 aircraft were ordered. Some were transferred to the Taiwanese Air Force and one of them became the first aircraft shot down by a surface to air missile. Fatigue problems in the wing structure forced the their retirement but by then, the U-2 had become operational. The USAF also contracted with Fairchild and Bell to produce design studies. The Fairchild design was still-born but the Air Force exhibited interest in the twin-engine Bell X-16.



Bell X-16 Model (Courtesy of Robert Meguid)

The Martin built Canberra, flown by the United States, as the B-57 developed into a number of photo-reconnaissance versions. Most notable were the high altitude RB-57D and the RB-57F. The RB-57D used a B-57B fuselage but the 64 foot span wing was replaced with one of 108 feet and a longer chord. The Wright J64 engines were replaced with Pratt & Whitney J-57s which added about 30% more thrust. Two K-38 and two KC-1 cameras were installed. Thirteen of the photo ships were produced followed by followed by seven

electronic intelligence ships. They were capable of cruising at 55,000 feet and were employed around the periphery of the Eastern Bloc and in a few cases, overflights of China. Structural problems with the long wings and the introduction of more capable aircraft led to their retirement



Hycon K-38 Camera

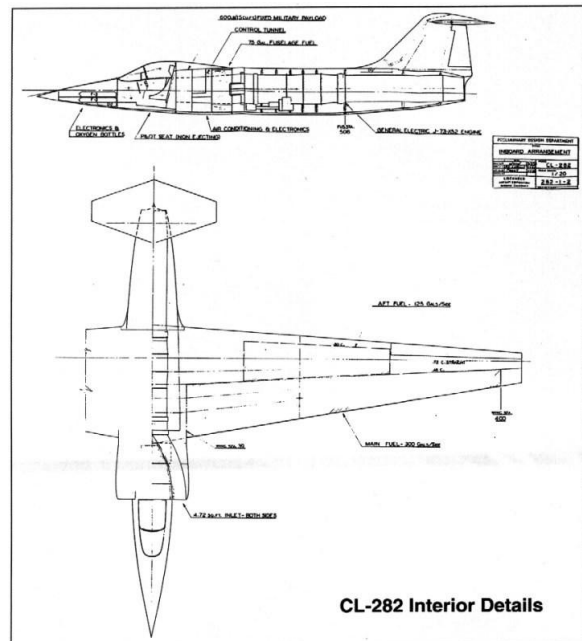
General Dynamics had the contract for maintenance and improvements of the 57Ds and in 1962, the Air Force requested that they study the possibility of a better performing aircraft based on the B-57. The aircraft which resulted was the RB-57F. She was equipped with a 122 foot wing and tail surfaces twice that of the area of the original B-57. New materials and a honeycomb structure lessened weight and increased strength. Spoilers were added and the gaps where controls met wing and tail surfaces were sealed to reduce drag. Pratt and Whitney TF33 engines replaced the Wright J-62s increasing thrust by nearly 250%. And finally, a Pratt J-60 turbojet developing 3,300 pounds of additional thrust were hung on pods under each wing.



RB-57F displays its wingspread at Warner-Robins, Georgia.

One of the cameras carried by the B-57F was a two ton HTAC capable of high resolution photography at an oblique distance of 60 miles. ELINT and SIGINT could be installed as needed. The 21 B-57Fs saw service both in Europe and the Far East. One was shot down over the Black Sea near Odessa by a SAM. Pakistan were loaned two of the aircraft and one of them flew missions during the 1965 war with India. The aircraft was severely damaged by a SAM but made it back to base, was repaired, and eventually, returned to the United States

Meanwhile, Lockheed heard about the Air Force quest of a high altitude aircraft and Kelly Johnson was given the go-ahead to do some preliminary design work. The Lockheed initiative was a private venture with no government support. As described in a previous chapter, Johnson and his Skunk Work team put together a proposal based upon using an F-104 fuselage equipped with a high aspect ratio wing called the CL-282. The design was offered to the Air Force but they were unhappy with its single engine and the lack of robustness in the design, so they rejected it.



CL-282 Concept Drawings (Lockheed)

Allen Donovan, head of Aeromechanics at Cornell, a member of one of Eisenhower's science advisory groups and a glider pilot, knew that any aircraft built to combat standards would be too heavy to achieve the altitude necessary to avoid detection and interception. The imputed safety of a twin engine design was a trap. The loss of an engine would force a descent to the 35,000 foot level and a shoot-down would result. By chance, Donovan met with a Lockheed executive and learned about the CL-282 and recognized that a powered "glider" would meet all the requirements of the needed aircraft. As for robustness, since the CL-282 was not a combat aircraft, structure could be sacrificed for performance. Donovan advocated for the Lockheed design but Air Force money was committed to Martin and Bell. Although the X-16 was never built, the Air Force did not cancel the project until the U-2 actually flew.

However, Donovan reported his finding to Killian and one of Killian's sub-groups headed by Land. Land contacted Richard Bissell at the CIA and Bissell became interested in the proposal and word filtered up the CIA chain of command. At the same time, Land and his sub-group developed a complete program for aerial reconnaissance using the CL-282 as a platform for James Baker's cameras.

Another obstacle in the adoption of the new aircraft was the CIA Director, Allen Dulles. Dulles was committed to human intelligence methods, a case officer with experience as far back as World War I. He was reluctant to commit the CIA to a field which he regarded as primarily military and displayed no enthusiasm for photo-reconnaissance overflight missions. But Killian had direct access to Eisenhower and used it. Eisenhower expressed enthusiasm and decided that the new aircraft would be a CIA asset.

Land continued to lobby Dulles, stating the obvious danger of military over-flights, which can be construed as an act of war versus civilian spying which, within the intelligence community, are understood to be a legitimate part of the game. This was an opinion strongly held by Eisenhower

also. Land also pointed out that the CIA would be pioneering a newer and more inclusive way of gathering hard data.

The Air Force also had to be convinced. They believed that the CL-282 was a one-trick pony whereas the X-16 could accomplish a number of missions. They were leery of the fragile and unique features of the CL-282. Donovan prepared a comparative briefing on all four designs and Lockheed's design fared well enough, along with the fact that Eisenhower supported it, to cause the Air Force to withdraw its objections. By this time, Lockheed, with heavy commitments in other projects was coy about its own proposal but Johnson persuaded the company to go forward with the design.

The CIA took lead in the project which did not make the Air Force happy. The Agency appointed Richard Bissell to manage the program which involved direct liaison with Lockheed, finding a base for the aircraft, supervising security and paying for the aircraft. The Air Force would find and train pilots and support operations. On 01 December, 1954, Kelly Johnson received the go-ahead to build the aircraft which was called the Angel by the Skunk Work workers.

CL-282 to U-2

During that first month, Johnson assembled his team, briefed them about the sensitive nature of their work, and emphasized the need for speed. The design and construction problems were unique and challenging. The P&W J57 engines had to be modified to operate seven miles higher than their design altitude and a low volatility fuel had to be formulated. Structural strength had to be traded off to obtain a light weight and the final aircraft's maximum g-load was just over two g's. A Cessna 182 can tolerate almost 4 g's in normal flight. Weight was also saved by incorporating a simple center-line landing gear and using detachable mid-wing mounted "pogos" for stability during the take-off run. Special consideration was given to keeping a pilot safe and efficient during the long missions planned. The aircraft would cruise above the Armstrong Line, around 65,000 feet, above

which the pressure is so low that blood boils at the temperature of a human body. A pressure suit would be required.

Johnson sent Lockheed's chief test pilot, Tony LeVier out to scout for an isolated airfield for testing the aircraft and training pilots. The Air Force general officer working on the project, Osmond Ritland suggested Nevada's Groom Lake, an abandoned AAF field on land held by the Atomic Energy Commission. The remoteness of the site and the restricted airspace around it guaranteed the security demanded by the CIA. Those assigned there called it Watertown Strip or Paradise Ranch but today it is better known as Area 51.

The small team of Lockheed engineers and technicians worked at a furious pace. Work weeks of 80 and 100 hours were common. As the design matured, very little of the original F-104 fuselage remained. Johnson and the Skunk works had a reputation for swift work. They had produced the P-80 Shooting Star, the first operational jet fighter for the USAF in 143 days from start to delivery! The first U-2 was loaded on a Douglas C-124 and delivered to Groom Lake, about 212 days after the official start date. The first official flight occurred on 04 August, 1955 when the tricky landing behavior of the aircraft manifested itself and disaster was only averted by the skill of LeVier.

Notes on U-2 Operational History 1956-1975

Pilots were selected from a pool of Strategic Air Command reservists who were flying the Republic F-84 Thunderjets. Selectees resigned from the military and became employees of Lockheed, a process called "sheep-dipping." Eisenhower was adamant that no military aviator would overfly Russia.

Training and practice missions occupied the U-2 crews for the next year, longer than it took to design and build the aircraft! On 2 June, 1956, the first overflight of hostile territory, East Germany and Poland occurred. Independence Day, 1956, 58 years ago, marked the first overflight of the Soviet Union. One set of photographs showed a Soviet

airbase and 20 M-4 Bison bombers. This supported claims that the "bomber gap," referred to in a previous section existed and that the United States was falling behind in weaponry. Actually, by accident, the pilot had photographed the one place where almost every Bison in the Soviet fleet was based. Part of the success of future U-2 missions over bomber bases was to show that this "gap" did not exist. One disturbing factor was that Soviet radar could sporadically track the U-2. Anti-radar modifications were tried but were not very effective. The radar tracking made Eisenhower cautious about overflights. From then on, overflights of the Soviet Union required Presidential authorization.

Soviet attempts to shoot down a U-2 intensified and the CIA knew that a shoot-down was a distinct possibility. Missions would be planned to avoid SAM sights and fly courses that minimized the time that the missile defenses could arrive at a tracking solution. Yet the information garnered was so valuable that successive missions were authorized whenever the need and the political climate were favorable.

The Missile Gap

In 1957, the Soviets tested their R-7 and in the fall of the same year, sent Senior Lieutenant Yuri Gagarin aloft on a modified R-7, the first human into space. The USAF had not taken missile delivery systems seriously, given our force of intercontinental bombers but the combination of a Soviet nuclear threat spearheaded by intercontinental ballistic missiles (ICBM) injected new energy into US research and development. Within two years, the first of the Atlas ICBM force was deployed. Both the R-7 and the Atlas were liquid fueled, required rather elaborate launch facilities and a long lead time to prepare for a launch.

The combination of the known Russian possession of nuclear armament and a belief that the Russians were far in advance of us in missile development led to another controversial issue which would be known as the "missile gap." If such a gap existed and the Russians launched a first strike, then we

would be unable to respond. The “missile gap” became a hot issue during the last years of the presidency of Dwight D. Eisenhower.

The Central Intelligence Agency rejected the idea that a Soviet nuclear threat existed and the issue became, like the “bomber gap,” a political football. Another overflight was made in July of 1959 in an attempt to determine the status of the Soviet ballistic missile force but the evidence brought back proved inconclusive. The British got back into the game and made several U-2 flights in the winter of 1959-60 and little evidence of Russian missile deployment was found.

John F. Kennedy, campaigning for the Senate in 1958 and the Presidency in 1960, is credited with inventing the term “missile gap.” He based his claims about U.S. weakness on leaked USAF documents which inflated the size of the Russian missile force. Eisenhower knew the real weakness of the Russians but was powerless to refute Kennedy since to do so would reveal details about the top secret U-2 overflights.



A U-2C, the mark Powers was flying when shot down, was on display at the old SAC Museum near Offutt AFB.

Eisenhower was scheduled to meet with Premier Nikita Khrushchev in Paris on 16 May, 1960 but authorized another flight in order to settle the question of a “missile gap.” This would be the 24th overflight of Soviet territory. Launched from Pakistan, the circuitous route would land in Norway. Francis Gary Powers, the most experienced of all U-2 pilots, was selected to fly the mission. One of a number of SA-2 missiles

salvoed at the U-2 detonated nearby and the plane was brought down near Sverdlovsk, some 2,000 miles after take-off. Powers survived, was captured, and eventually exchanged for Rudolf Abel, a Soviet spy. The Paris Summit meeting was cancelled and the U-2 would never again overfly the Soviet Union.

Taiwanese Air Force U-2 Missions

In 1961, the United States transferred two U-2s to the Republic of China on Taiwan. Several of their RB-57s had been shot down by the Chinese communists during overflights of the mainland. The primary mission of the Taiwanese was assessing the nuclear capabilities of the People's Democratic Republic of China. Over the next 13 years, the Taiwanese flew a total of 220 missions and had five of their U-2s shot down.

The Cuban Missile Crisis

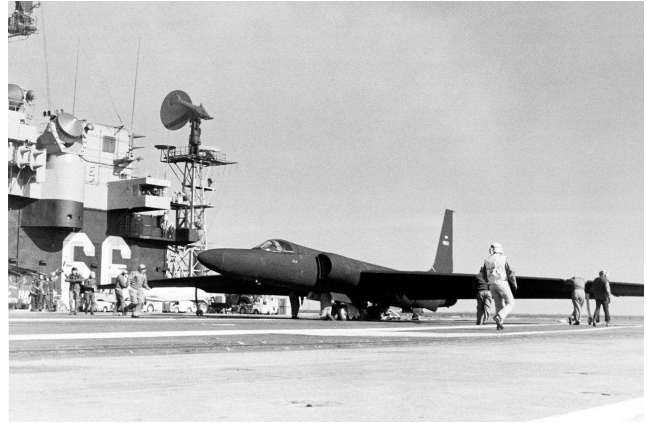
In 1962, the Russians, at the behest of Cuban Premier Fidel Castro, attempted to deploy IL-28 Beagle bombers and install intermediate range ballistic missiles in Cuba. Aerial photographs were key pieces of evidence and missions were flown by USAF U-2s and McDonnell RF-101 Voodoos and US Navy Chance-Vought RF-8 Crusaders. The photographs were presented to President John Kennedy who consulted with his advisors and ordered a naval “quarantine” of Cuba. “Naval quarantine” is a term of art which is essentially equivalent to a blockage but a blockade is an act of war and Kennedy was not eager to labeled a 'war monger.” Such are the niceties of diplomatic language.



RF-101C at Maxwell AFB



RF-8G at Miramar Marine Corps Air Museum



U-2 on U.S.S. America (USN Photo)

Kennedy contacted Premier Khrushchev and stated that the United States would not allow offensive weapons to be deployed in Cuba and demanded that more be shipped and that those already in Cuba be removed. The two sides jostled diplomatically. While this was going on, a Strategic Air Command U-2C was shot down over Cuba and the pilot, Maj. Rudolf Anderson, killed.

U.S. military forces went to Defensive Readiness Condition Two (DEFCON-2), the preliminary stage for a nuclear war, primed to engage in a six hour time frame. Both leaders understood the ramifications of nuclear war and after two weeks an agreement was reached. The offensive weapons would be removed from Cuba and the United States would remove its nuclear tipped Jupiter IRBM missiles from Turkey and promised not to invade Cuba.

The U-2 Gets Sea-Legs

Altitude may be the “holy grail” of a surveillance aircraft but the range to reach an objective and return is also necessary. A 1963 CIA project developed a carrier-based variant, the U-2G, but its operational use was limited to investigating the French atomic bomb test site in French Polynesia. Take-offs were no problem and the wind over the deck of a carrier at flank speed and the high lift wing of the U-2 obviated the use of a catapult. Landings were a different story. The carrier modified U-2 needed spoilers, a hook, and a stronger landing gear.

Vietnam

The deepening involvement of the United States in its air war in Indochina created a demand for missions to determine the siting of missile batteries and deployment of North Vietnamese interceptors, both of which threatened the bombing campaign in the north. The U-2 and other specialized aircraft contributed to the store of visual and electronic information needed for mission planning.

Archangel

The CIA knew early on that the Russians had the ability to track the U-2 and knew that its invulnerability to intercept was temporary. Modifications were tried to reduce the radar cross section (RCS) of the U-2. The use of radar absorbing materials and electronic counter measure equipment did diminish the RCS but they were only temporary expedients. A year after the first overflight of the Soviet Union and well before the Power's shoot-down, Bissell appointed Land to chair a committee charged with conceiving of an aircraft to replace the U-2. Both Lockheed and Convair entered into the design competition but ultimately, Lockheed's A-12, called Archangel by the Skunk workers was found superior to Convair's Kingfish on the basis of cost and Lockheed's record of past achievement.



Convair Kingfish
(Painting by David Schweitzer from
Code One Magazine)

Not only would the A-12 have a smaller RCS than the U-2, it would fly higher and much, much faster, Mach 3 compared to the U-2's Mach 0.7! The CIA, in an uncharacteristic flash of whimsy, code-named the Mach 3 A-12, *Oxcart*. Speed reduces the time during which an adversary can set up an intercept or missile firing solution but the price was the need to solve extraordinary technical problems in materials, aerodynamics, and thermodynamics.

Titanium was chosen as the principal structural metal due to its light weight and high strength under thermal loads. But titanium requires special tooling and handling and was in short supply. Ironically, a U.S. trade deal with the Soviet Union meant that imported Russian titanium would be used to build the new spy ship.

The fuselage was carefully fashioned, not only to reduce radar reflections but also to maximize aerodynamic efficiency at high speed. chines, leading edges of the wings which extend from just aft of the nose to the main wing structure increased stability added lift. The geometry of the engine's air inlets were crafted so as to reduce and position the supersonic shock waves and make it digestible by the engines.

Skin temperatures caused by air friction ranging around 500 degrees Fahrenheit affected the aircraft in a number of ways. The use of titanium solved one problem but a number of other solutions were found to assist cooling. The black color was an efficient heat radiator and fuel lines from the tanks to the engines passed near the skin, not only absorbing heat which cooled the aircraft but also making the specially formulated low vapor fuel

more volatile before it entered the combustion chambers.

These many problems were solved in typical Skunk Works fashion: minimal bureaucracy, innovative thinking, close working relationships among designers and artisans, and an extraordinary team spirit.

The first flight occurred on 25 April, 1962 and was a near disaster. The aircraft lifted off with Louis Schalk at the controls and immediately became unstable. The stability augmentation system had not been connected since the first flight was planned to be a quick take-off and touchdown. Fighting to keep control, Schalk managed to land the aircraft on the dry lake about a mile beyond the end of the runway.



This A-12 at Huntsville overflew North Korea after the capture of U.S.S. Pueblo.

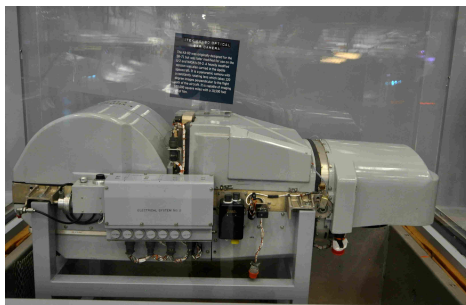
The aircraft, 15 of which were built, was equipped with a suite of different Perkin-Elmer, Eastman Kodak, and Hycon cameras which could provide high resolution and stereo imagery. Quartz windows developed by Corning Glass had to be used due to the intense heat generated by skin friction at high speed. At best, objects as small as eight inches could be resolved from an operating altitude in excess of 80,000 feet.

The A-12 was a CIA asset with USAF support for pilot selection, basing, and aerial refueling. Oddly enough, it and its cousin, the SR-71 never flew any strategic reconnaissance overflights. Although almost invulnerable to interception, they still were detectable and no President would ever authorize their use over the Soviet Union or China.

The USAF, as usual, was unhappy with the fact

that the CIA had control of the aircraft and contracted for their own version, the SR-17 Blackbird of which 32 were built.. A casual glance reveals very little difference in appearances but the two seat SR-71 was six feet longer and carried a half-ton more in payload making it somewhat more versatile than the single seat A-12 which lacked the ELINT equipment carried by the SR-71. The A-12 did perform better. It was slightly faster and could fly two miles higher but it has shorter legs. Unrefueled, its range was about 1000 miles less than the SR-71. This amounts to about a half hour in time at Mach 3!

Two years after the A-12 started flying, the SR-71 made its first flight. The camera equipment consisted of Itek and Hycon units which provided imagery along the track and horizon-to-horizon coverage at right angles to the track.



Itek KA-80 Optical Bar Camera used in the SR-71, U-2, and in modified form, the Apollo mission.



SR-71 at Mahoney's SAC Museum,

Most early SR-71 missions operated out of Kadena AFB on Okinawa and provided tactical reconnaissance of targets in Vietnam, Cambodia, and Laos during our involvement in Indochina. Another overseas base was Mildenhall in England where it was used offshore of the Soviet bloc to gain oblique photographs and SIGINT and ELINT data. Beale AFB in California was the primary

base for the units which employed the SR-71.

The SR-71 was retired from USAF service in 1999 due to the cost of its operation. Much of what it accomplished could be done by reconnaissance satellites although they were not as flexible and could not immediately be tasked to overfly a trouble spot. The far less glamorous U-2s remained in service and performed the same tactical reconnaissance task so the SR-71 was not only expensive but also redundant. NASA maintained two of them as research vehicles.

The more pedestrian U-2 Dragon Ladies were continuously upgraded. The U-2C had a more powerful J-75 engine and the U-2E were the first capable of aerial refueling. An attempt was made to better define the mission of the aircraft from its notorious spy plane antecedents and a new designation, TR-1 for **Tactical Reconnaissance** was applied to a new batch of production aircraft. They carried refined radars, avionics and ECM gear and were re-designated as the U-2S. NASA flies a version called the ER-2, a vehicle designed to gather data on earth resources in the atmosphere, in the oceans, and on land.



TR-1 (USAF Photo)

The Air Force U-2s continue to serve and have ventured over most of the war zones from the 1960s to today. There are plans to replace the U-2 fleet with the Northrop-Grumman RQ-4 Global Hawk unmanned aerial vehicle. This will require the Air Force to refit the UAVs with U-2 sensor equipment with an anticipated price tag of 1.9 billion dollars. The claim is that the Global Hawk costs about \$8,000 dollars less per hour to fly. Advocates for both systems, manned and unmanned, are lobbying Congress and the outcome of the debate is uncertain at this time.